3.5 Polynomials of the Form $x^2 + bx + c$

Multiplying Binomials and Factoring Trinomials

$2x(3x+5) = 6x^2 + 10x$

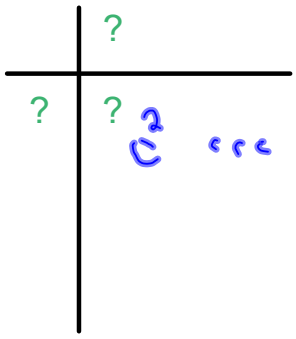
M

F

How to multiply 2 binomials:

1. Use algebra tiles. $(c+5)(c+3)$

To expand: $(c + 5)(c + 3)$
Make a rectangle with dimensions $c + 5$ and $c + 3$.
Place tiles to represent each dimension, then fill in the rectangle with tiles.

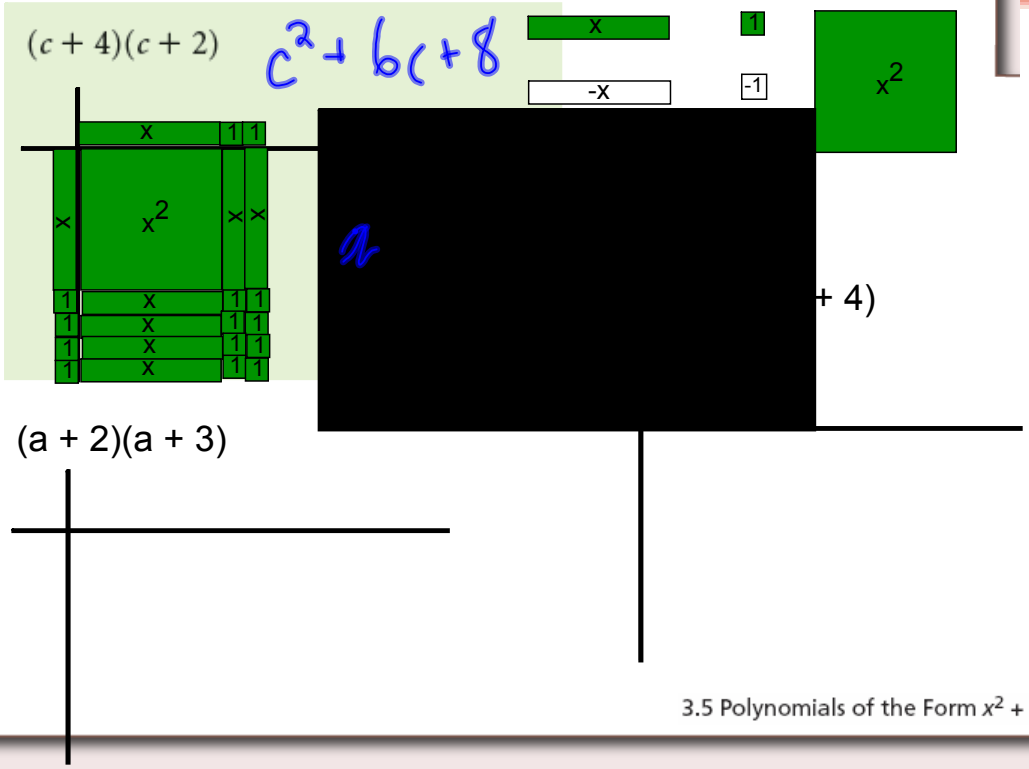


$= c^2 + 8c + 15$

The tiles that form the product are: ? c^2-tile, ? c-tiles, and ? 1-tiles.
So, $(c + 5)(c + 3) =$?

Sketch the multiplication of algebra tiles for each of the following:

$(c + 4)(c + 2)$ $c^2 + 6c + 8$



$(a + 2)(a + 3)$

2. Use an Area Model to help you:

Expand $(h + 11)(h + 5)$

L W

	h	11
h	$(h)(h) = h^2$	$(h)(11) = 11h$
5	$(5)(h) = 5h$	$(5)(11) = 55$

$= h^2 + 16h + 55$

So, $(h + 11)(h + 5) =$?

$=$?

?

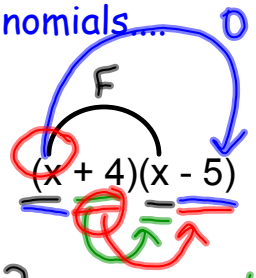
$(a+20)(a+3)$ Area Model

	a	20
a	a^2	$20a$
3	$3a$	60

$= a^2 + 23a + 60$

3. Use FOIL to multiply 2 binomials....

First
Outside
Inside
Last



$x^2 - 5x + 4x - 20$

$x^2 - x - 20$

Example 1 Multiplying Two Binomials

Expand and ~~simplify~~

Use FOIL

a) $(x-4)(x+2)$

$x^2+2x-4x-8$

x^2-2x-8

b) $(8-b)(3-b)$

$24-8b-3b+b^2$

$24-11b+b^2$

$=b^2-11b+24$

CHECK YOUR UNDERSTANDING

SOLUTION

Classwork/Homework

Page 166 #4c, 5b, 9ab(use FOIL), 12abcd

Thursday, October 20th

- Check and go over yesterday's homework
- Notes/Examples on factoring Trinomials
- Practice Questions

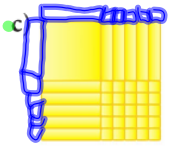
Classwork/Homework

Page 166 #4c, 5b, 9ab(use FOIL), 12abcd

4. Write the multiplication sentence that each set of algebra tiles represents.

a)

b)

c) 

d) 

$(x+5)(x+5)$

$= x^2 + 10x + 25$

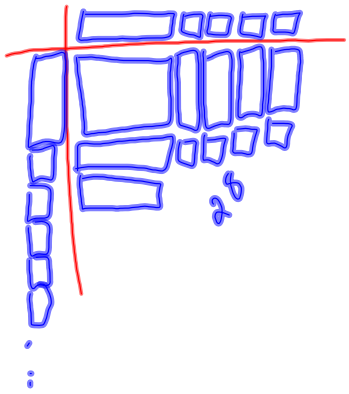
5. Use algebra tiles to determine each product. Sketch the tiles you used.

a) $(b + 2)(b + 5)$

b) $(n + 4)(n + 7)$

c) $(h + 8)(h + 3)$

d) $(k + 1)(k + 6)$



9. Multiply each pair of binomials. Sketch and label a rectangle to illustrate each product.

a) $(m + 5)(m + 8)$

b) $(y + 9)(y + 3)$

c) $(w + 2)(w + 16)$

d) $(k + 13)(k + 1)$

$(m+5)(m+8)$

$m^2 + 8m + 5m + 40$

$= m^2 + 13m + 40$

$(y+9)(y+3)$

$= y^2 + 3y + 9y + 27 = y^2 + 12y + 27$

12. Expand and simplify. Sketch a rectangle diagram to illustrate each product.

a) $(g - 3)(g + 7)$

b) $(h + 2)(h - 7)$ → $h^2 - 5h - 14$

c) $(11 - j)(2 - j)$

d) $(k - 3)(k + 11)$

e) $(12 + h)(7 - h)$

f) $(m - 9)(m + 9)$

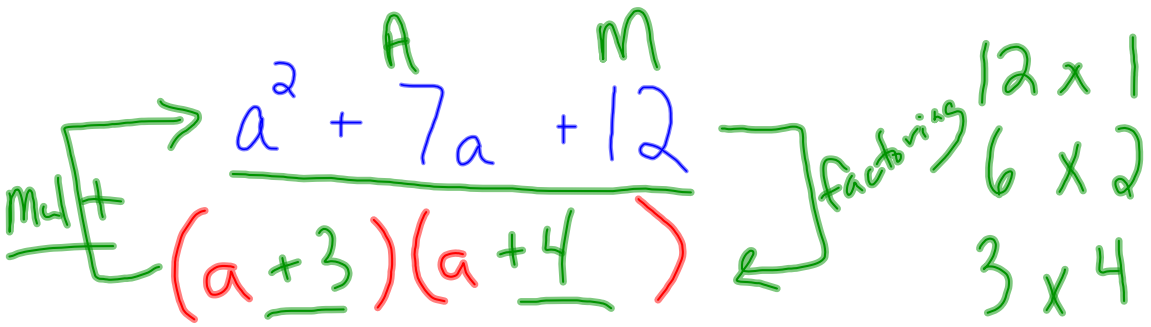
g) $(n - 14)(n - 4)$

h) $(p + 6)(p - 17)$

	g	-3
g	g^2	$-3g$
$+7$	$7g$	-21

$= g^2 + 4g - 21$

h) $(p + 6)(p - 17)$



Look at the numbers in the trinomial and the binomial.

$v^2 + 12v + 20 = (v + 2)(v + 10)$

Factoring a Trinomial

To determine the factors of a trinomial of the form $x^2 + bx + c$, first determine two numbers whose sum is b and whose product is c. These numbers are the constant terms in two binomial factors, each of which has x as its first term.

Example 2 Factoring Trinomials

Factor each trinomial.

a) $x^2 - 2x - 8$

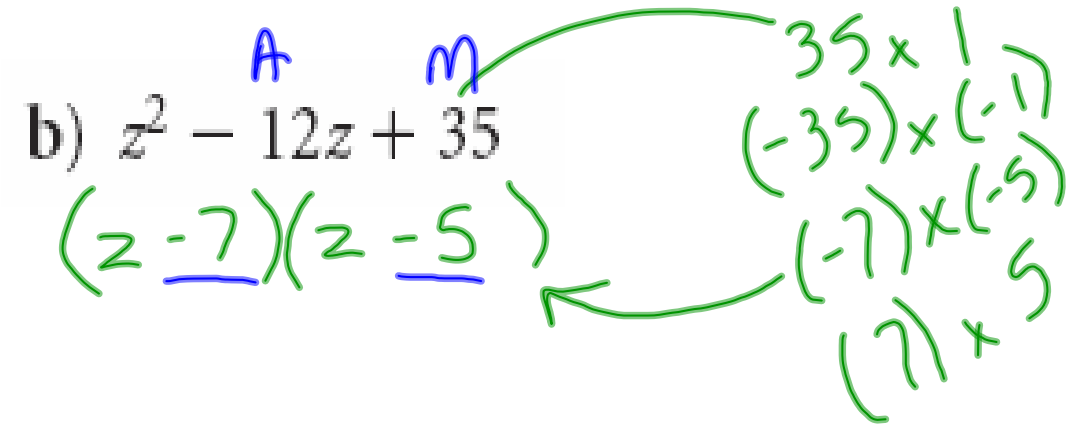
You need to find two numbers that multiply to give -8, but add to give -2. Create a list to help you....

Factors of −8	Sum of Factors
−1, 8	−1 + 8 = 7
1, −8	1 − 8 = −7
−2, 4	−2 + 4 = 2
2, −4	2 − 4 = −2

$= (x + 2)(x - 4)$

CHECK YOUR UNDERSTANDING

SOLUTION



Don't forget that you can always check to see if you factored correctly. You can do this by expanding (multiplying) the two binomials.

Example 3 Factoring a Trinomial Written in Ascending Order

Factor: $-24 - 5d + d^2$

M A

$d^2 - 5d - 24$

CHECK YOUR UNDERSTANDING

3.5 Polynomials of the Form $x^2 + bx + c$

SOLUTION

Classwork/Homework

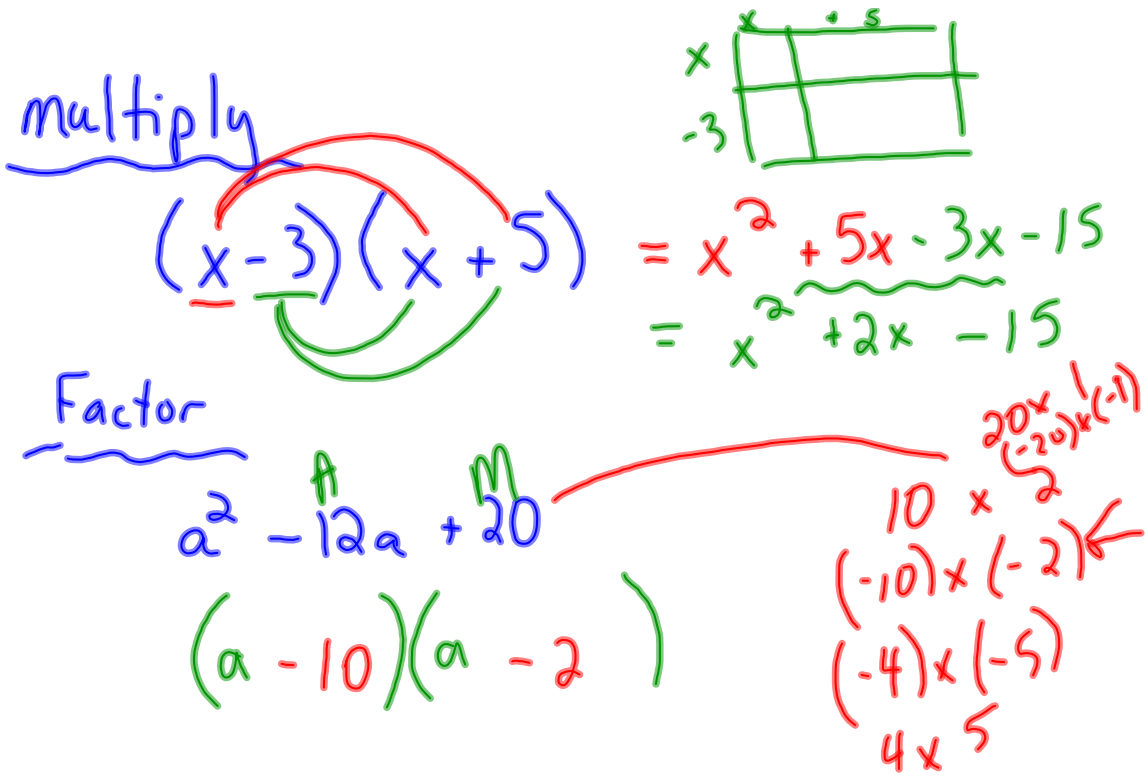
Page 166 # 10, 11ab, 14abcd, 15bd

Monday, October 24th

- Review Last week's work
- Check and go over Thursday's homework (Pg.166)
- Notes/Examples on removing the gcf, then factoring the trinomials
- Practice Questions

Please take out your notebooks and open to your class work from Thursday.

Note: Unit Test on Friday!!



multiply

$(x-3)(x+5) = x^2 + 5x - 3x - 15$

$x^2 + 2x - 15$

Factor

A M

$a^2 - 12a + 20$

$(a-10)(a-2)$

Classwork/Homework

Page 166 # 10, 11ab, 14abcd, 15bd

10. Copy and complete.

a) $(w + 3)(w + 2) = w^2 + \square w + 6$

b) $(x + 5)(x + \square) = x^2 + \square x + 10$

c) $(y + \square)(y + \square) = y^2 + 12y + 20$

11. Factor. Check by expanding.

a) $x^2 + 10x + 24$

b) $m^2 + 10m + 16$

c) $p^2 + 13p + 12$

d) $s^2 + 12s + 20$

e) $n^2 + 12n + 11$

f) $h^2 + 8h + 12$

g) $q^2 + 7q + 6$

h) $b^2 + 11b + 18$

(a) $(x+6)(x+4)$

(b) $(m+8)(m+2)$

14. Factor. Check by expanding.

a) $b^2 + 19b - 20$

b) $t^2 + 15t - 54$

c) $x^2 + 12x - 28$

d) $n^2 - 5n - 24$

e) $a^2 - a - 20$

f) $y^2 - 2y - 48$

g) $m^2 - 15m + 50$

h) $a^2 - 12a + 36$

(a) $(b-1)(b+20)$

(b) $(t-3)(t+18)$

(c) $(x-2)(x+14)$

(d) $(n+3)(n-8)$

15. Factor. Check by expanding.

a) $12 + 13k + k^2$

b) $-16 - 6g + g^2$

c) $60 + 17y + y^2$

d) $72 - z - z^2$

$-z^2 - z + 72$

$(-z+8)(z+9)$

$-z^2 - 9z + 8z + 72$

$-z^2 - z + 72$

b) $g^2 - 6g - 16$

$(g-8)(g+2)$

Example 4 Factoring a Trinomial with a Common Factor and Binomial Factors

Factor.

$-4t^2 - 16t + 128$

We are going to need to factor out the gcf first, then factor the trinomial that remains...

GCF = -4

$-4(t^2 + 4t - 32) = -4(t - 4)(t + 8)$

A m

-4×8

-8×4 $2 \cdot 2$

-16×2 16×2 $32 \cdot 1$ -32×1

CHECK YOUR UNDERSTANDING

SOLUTION

3.5 Polynomials of the Form $x^2 + bx + c$

a) $4y^2 - 20y - 56$

GCF = 4

$4(y^2 - 5y - 14)$

A m

$4(y - 7)(y + 2)$

-14×1

14×-1

-7×2

7×-2

Classwork/Homework

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